FAQ Sheet: Animal Feed and Human Foodborne Illness

The Centers for Disease Control and Prevention (CDC) estimates that several million people in the United States become ill each year from eating food contaminated with harmful bacteria, such as *Salmonella*. Food-producing animals including cattle, chickens, pigs, and turkeys are sources for many of these harmful bacteria. Several studies have shown that harmful bacteria frequently contaminate animal feed. If an animal consumes contaminated feed, the harmful bacteria can be passed to humans through contaminated food and cause illness. A recent article by CDC (1) entitled "Bacterial Contamination of Animal Feed and Its Relationship to Human Foodborne Illness" (available at http://www.cdc.gov/narms/), reviews this important issue and recommends ways to help prevent human foodborne illness by improving the safety of animal feed.

The following are answers to frequently asked questions about animal feed and human foodborne illness.

1. How does bacterial contamination of animal feed relate to human foodborne illness?
Animal feed, which is at the beginning of the food production chain, can contain *Salmonella* and other bacteria that are harmful to humans. When animal feed contains harmful bacteria and is eaten by food-producing animals such as cattle, chickens, pigs, and turkeys, the harmful bacteria may take up residence in the animal's intestine. Sometimes the bacteria cause illness but most often the bacteria reveal no sign of their presence. If the harmful bacteria continue to live in the animal's intestine, the bacteria can then contaminate meat during slaughter or cross-contaminate other food products. Animal feces containing harmful bacteria can also contaminate water used for agriculture and for drinking. Thus, harmful bacteria in animal feed can travel through the food production chain, from "farm to fork", and cause human foodborne illness.

An example of such harmful bacteria is *Salmonella*. Animal feeds are known to be frequently contaminated with *Salmonella* in the United States. The *Salmonella* present in feeds have been shown to infect animals that eat the contaminated feeds. Meats, eggs, milk, and other foods derived from *Salmonella*-infected animals, and/or from animals processed for food along with infected animals, are often contaminated with *Salmonella* (3). *Salmonella*-contaminated meats and eggs are known to be major sources of foodborne illness caused by *Salmonella*.

2. How many cases of human foodborne illness does contaminated animal feed cause in the United States each year?
The CDC estimates that several million people in the United States become ill each year from eating food contaminated with harmful bacteria, such as *Salmonella*. These illnesses lead to an estimated 34,000 hospitalizations and 800 deaths each year (2). Although we do not know the precise source for most of these illnesses, foodborne outbreaks are the best indicators of the sources of foodborne illness. If an outbreak is caused by contaminated food, it is often difficult to determine exactly how the food became contaminated. The food may have become contaminated on the farm where the food was grown, in the kitchen where the food was prepared, or elsewhere along the farm-to-table continuum. Furthermore, in the case of food-producing animals, contamination may have begun with supplies to the farm, such as contaminated animal feed.

In the United States, outbreaks of human foodborne illness have been traced back to contaminated animal feed. One of the best examples of this link, which is described in the recent CDC article (1), is a *Salmonella* outbreak that was linked to eating chicken livers. In that outbreak, the disease investigators traced the source of the contamination to chicken feed made with bone meal that was contaminated with *Salmonella*. This means that we know that contaminated feed can lead to foodborne illness, though we do not know how large a proportion of the problem it represents.

3. Is animal feed often contaminated with harmful bacteria?
Many studies provide evidence that animal feed is frequently contaminated by harmful bacteria. For example, in 1993 the Food and Drug Administration (FDA) performed *Salmonella* testing on samples from 78 plants that produced protein-based feed and 46 mills that produced vegetable-based feed. *Salmonella* was detected in 56% of the protein-based samples, and 36% of the vegetable-based samples. A 1994 FDA study found that 25% of 89 animal feed samples collected from a sample of mills and farms were contaminated with *Salmonella*. Studies conducted by the feed industry and researchers in the United States indicate similar levels of *Salmonella* in feeds and feed ingredients. Other studies from around the world have also demonstrated the presence of *Salmonella* in various types of feed and feed ingredients. This is important because the U. S. imports feed ingredients for use in animal feed.

4. How does animal feed get contaminated with harmful bacteria?
Animal feed can get contaminated with harmful bacteria in several ways. Contamination may occur because the raw ingredients used in manufacturing the feed may already be contaminated with the bacteria. For example, rendering plants may produce animal feed ingredients from contaminated animal by-products (e.g., meat by-products not suitable for human consumption). Contamination may also occur if feed that was originally free of harmful bacteria is exposed to contaminated dust or feces, or other materials from infected rodents, flies, cockroaches, beetles and other animal pests. Feed may also become contaminated during transport or storage.

5. Who regulates animal feed?
Several agencies of the federal government are responsible for regulating feed. However, the primary legal responsibility for feed lies with the FDA. The FDA is responsible for making sure that feed is properly labeled, safe for its intended use, and is not a hazard to animal and human health. Other agencies that have responsibility over feed include the U.S. Department of Transportation and the U.S. Department of Agriculture (USDA). The Department of Transportation regulates the safe transportation of animal feed, while the Animal and Plant Health Inspection Service of the USDA is responsible for ensuring the health and proper care of animals and plants that may be used in feed production.

6. What can be done to improve the safety of animal feed?
Three important steps would improve the safety of animal feed in the United States. First, regular monitoring of animal feed for harmful bacteria is needed to better understand the importance of animal feed contamination. By comparing these bacteria to those recovered from animals, food, and humans, we will better understand how harmful bacteria flow through the food chain. We can then develop ways to prevent contamination and, in turn, prevent

foodborne illness caused by contaminated animal feed. Second, a program to reduce contamination by harmful bacteria, focusing specifically on *Salmonella*, is needed for the feed industry. Using the Hazard Analysis Critical Control Point (HACCP) program, the producer would identify the sources of harmful bacteria along with other potential hazards and apply measures to control or prevent contamination. Last, a microbial standard for *Salmonella*-contamination of animal feed would help to reinforce these prevention measures. These measures will help to improve the safety of animal feed and contribute to the prevention of human foodborne illness.

7. What can I do to help protect myself from foodborne illness?
There are a few simple precautions that everyone can take to help reduce their risk of getting a foodborne illness. These precautions can be found on the CDC foodborne illness information webpage.

References:
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2) Mead, P.S., L. Slutsker, V. Dietz, L.F. McCaig, J.S. Bresee, C. Shapiro, P.M. Griffin and R.V. Tauxe. 1999. Food-related illness and death in the United States. Emerging Infectious Diseases. 5(5):607-625

3) Ekperigin, H. E., and K. V. Nagaraja. *Salmonella*. In: Microbial food borne pathogens, Tollefson, L. (ed). Veterinary Clinics of North America 14 (1): 17 – 29, March 1998. W. B. Saunders, Philadelphia

Additional References:
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